REMARKS

Reconsideration and allowance are respectfully requested in light of the above amendments and the following remarks.

Proposed changes to Figs. 1 and 2 are submitted herewith to overcome the objections thereto.

Claims 1, 2, 5, 13, 15, 16, and 20 stand rejected, under 35 USC §102(b), as being anticipated by Pengov (US 6,051,903). Claim 14 stands rejected, under 35 USC §102(b), as being anticipated by Heese et al. (US 6,194,805). Claims 3, 4, 8-12, and 17-19 stand rejected, under 35 USC §103(a), as being unpatentable over Pengov. Claim 6 stands rejected, under 35 USC §103(a), as being unpatentable over Pengov in view of Smith (US 5,146,127). Claim 7 stands rejected, under 35 USC §103(a), as being unpatentable over Pengov in view of Byrne et al. (US 3,956,678). Applicants respectfully traverse these rejections.

Claim 1 recites:

> *A two-phase switched reluctance machine (TPSRM), comprising:*
> *a stator having a plurality of poles and a ferromagnetic or iron back material; and*
> *a rotor having a plurality of poles and a ferromagnetic or iron back material, wherein:*
> *current flowing through coils wound around a first set of the plurality of stator poles induces a flux flow through the first set of stator poles and portions of the stator back material during a first excitation phase,*
> *current flowing through coils wound around a second set of the plurality of stator poles induces a*

flux flow through the second set of stator poles and portions of the stator back material during a second excitation phase, and

the numbers of stator and rotor poles are selected such that substantially no flux reversal occurs in any part of the stator back material as a result of transitioning between the first and second excitation phases.

Pengov fails to disclose the feature recited in claim 1 of a TPSRM whose numbers of stator and rotor poles are selected such that substantially no flux reversal occurs in any part of the stator back material as a result of transitioning between first and second excitation phases. By contrast to the claimed feature, Pengov discloses a switched reluctance motor (SRM) that necessarily produces substantial flux reversal in the stator back material between phase excitations, as explained below.

Pengov discloses a two-phase switched reluctance motor (SRM) having a rotor that moves a predetermined angular amount during each phase excitation (Pengov col. 5, lines 23-26). Pengov's Figs. 3-5 illustrate the flux patterns flowing through the SRM during three distinct states of the rotor's angular movement for a single, phase A excitation (see col. 5, lines 51-65). For ease of discussion, the states corresponding to Figs. 3-5 are referred to herein as the initial, intermediate, and final states, respectively.

Pengov discloses that the stator poles of the SRM are uniformly spaced apart (col. col. 2, lines 12-15 and 47-50, col. 4, lines 53-56, etc.). Due to the uniform spacing of the stator poles, it may be determined by examination of Pengov's Figs. 3 and 6 that the relative positions of the rotor-to-phase A stator poles, illustrated in Fig. 3, correspond to the relative positions of the rotor-to-phase B stator poles illustrated in Fig. 6. Therefore, Fig. 6 essentially illustrates the initial state of phase B excitation. Moreover, Fig. 6 will have the same flux flow pattern as Fig. 3, though rotated counter-clockwise an amount equal to the angular separation of adjacent phase A and B stator poles.

Exhibit 1, enclosed herewith, corresponds to Pengov's Fig. 5 and illustrates the directional flow of flux through Pengov's SRM during the final state of phase A excitation. Exhibit 2 corresponds to Pengov's Fig. 6 and illustrates the directional flow of flux through Pengov's SRM during the initial state of phase B excitation. Note that Exhibit 2 has the same flux flow pattern as Pengov's Fig. 3 but rotated slightly counter-clockwise so that the flux flows through the phase B stator poles rather than the phase A stator poles. Note also that both Exhibits 1 and 2 illustrate the directional flux flow required to rotate the

rotor counter-clockwise, as indicated by Pengov's rotational arrows D.

Examination of Exhibits 1 and 2 reveals that during the transition from phase A to phase B excitation, substantial portions of the stator back material experience a flux reversal. These portions are identified in Exhibit 3 by shading. The flux reversal described for this particular phase transition similarly occurs for every phase transition transpiring over the course of one rotor revolution, though the flux reversal occurs in different areas of the stator back material for each transition. Since Pengov's SRM has twelve equally spaced stator poles, of which six are phase A poles and six are phase B poles, and the three rotational states disclosed by Pengov occur for the rotation of a rotor reference point from one stator pole to a corresponding point of an adjacent stator pole, it necessarily follows that Pengov's SRM experiences flux reversal in the stator back material for each of the twelve phase-excitation transitions occurring during one revolution of the rotor. Moreover, Pengov's SRM experiences flux reversal in all parts of the stator back material over the course of one rotor revolution.

By contrast to Pengov's disclosure, the SRM defined by claim 1 has substantially no flux reversal occurring in any part of the stator back material between excitation phases. Applicant's Figs.

3A and 4A illustrate an exemplary, but non-limiting, SRM within the scope of claim 1. As may be determined by examination of Figs. 3A and 4A, no similar flux reversal to that occurring in Pengov's SRM occurs in Applicants' disclosed SRM.

In accordance with the above discussion, Applicants submit that Pengov does not anticipate the subject matter defined by claim 1. More specifically, Pengov does not disclose the feature recited in claim 1 of a TPSRM whose numbers of stator and rotor poles are selected such that substantially no flux reversal occurs in any part of the stator back material as a result of transitioning between first and second excitation phases. Independent claim 15 similarly recites the feature distinguishing apparatus claim 1 from Pengov, though with respect to a method. For the same reason this feature distinguishes claim 1 from Pengov, so too does it distinguish claim 15. Therefore, allowance of claims 1 and 15 and all claims dependent therefrom is warranted.

Independent claim 14 recites a two-phase SRM. Heese does not disclose a two-phase SRM. Instead, Heese discloses only three- and four-phase SRMs. More specifically, Heese discloses the following in column 2, lines 52-59.

> *The feature combinations disclosed concretely indicate five different exemplary embodiments. From these five exemplary embodiments, one skilled in the*

art of drive technology can, for example, choose between embodiments to be operated in __three-phase__ or exemplary embodiments to be operated in __four-phase__ (emphasis added).

Accordingly, Heese does not anticipate the subject matter defined by claim 14. Therefore, allowance of claim 14 is warranted.

Dependent claim 12 recites:

> *The TPSRM of claim 1, wherein the numbers of stator and rotor poles are further selected such that a flux reversal occurs only once in any part of the rotor back material, excluding the rotor poles, per revolution of the rotor as a result of transitioning between the first and second excitation phases.*

By contrast to the subject matter defined by claim 12, Pengov discloses an SRM that necessarily produces flux reversal in the rotor back material more than once per rotor revolution as a result of transitioning between excitation phases. Referring again to Exhibits 1 and 2, it may be seen by the directional arrows of flux flow in the rotor back material that flux reversal occurs therein during the transition of phase excitation. Exhibit 4 illustrates the area of the rotor back material experiencing the flux reversal by shading.

As discussed above, in connection with the rejection of claim 1, Pengov discloses that twelve phase excitation transitions occur for every revolution of the rotor. Also, as mentioned previously, Pengov discloses that the same three flux-

pattern states occur during each of the twelve phase excitations occurring over the course of one rotor revolution. From these facts, it necessarily follows that flux reversal occurs in the rotor back material of Pengov's SRM between each of the phase excitation transitions occurring over the course of one rotor revolution.

Accordingly, Pengov does not anticipate the subject matter of claim 12. Specifically, Pengov does not disclose the feature recited in claim 12 whereby the numbers of stator and rotor poles of a TPSRM are selected such that a flux reversal occurs only once in any part of the rotor back material, excluding the rotor poles, per revolution of the rotor as a result of transitioning between first and second excitation phases. Claim 19 similarly recites the feature distinguishing apparatus claim 12 from Pengov, though with respect to a method. For the same reason this feature distinguishes claim 12 from Pengov, so too does it distinguish claim 19. Therefore, allowance of claims 12 and 19 is warranted for this independent reason.

In view of the above, it is submitted that this application is in condition for allowance and a notice to that effect is respectfully solicited.

If any issues remain which may best be resolved through a telephone communication, the Examiner is requested to telephone

the undersigned at the local Washington, D.C. telephone number listed below.

Respectfully submitted,

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JEL/DWW/att

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IN THE DRAWINGS

Proposed changes to Figs. 1 and 2 are submitted herewith, with a Letter to the Official Draftsman.

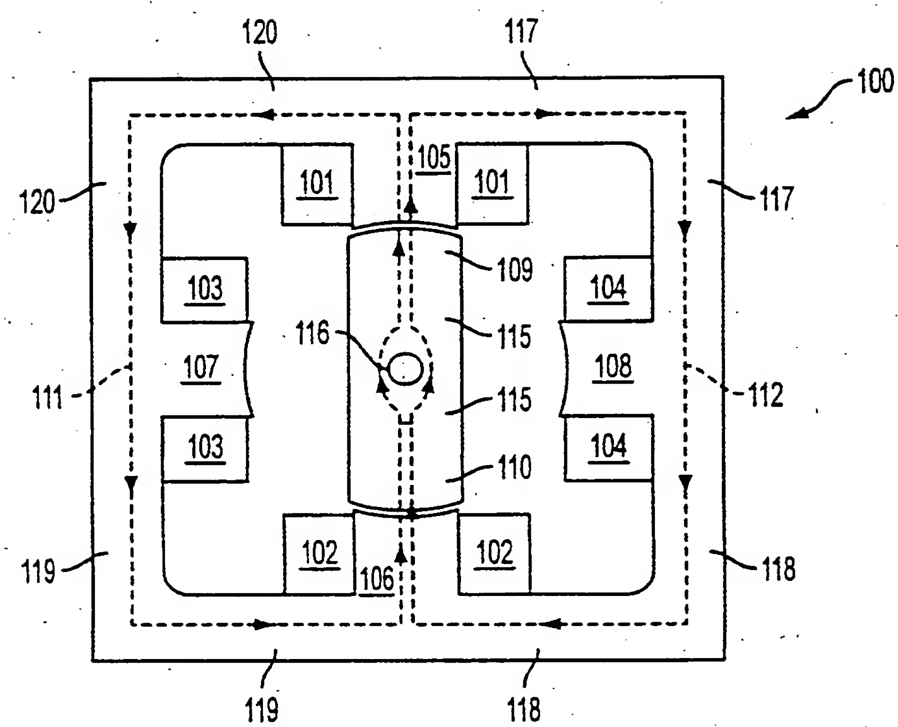

FIG. 1

RELATED ART

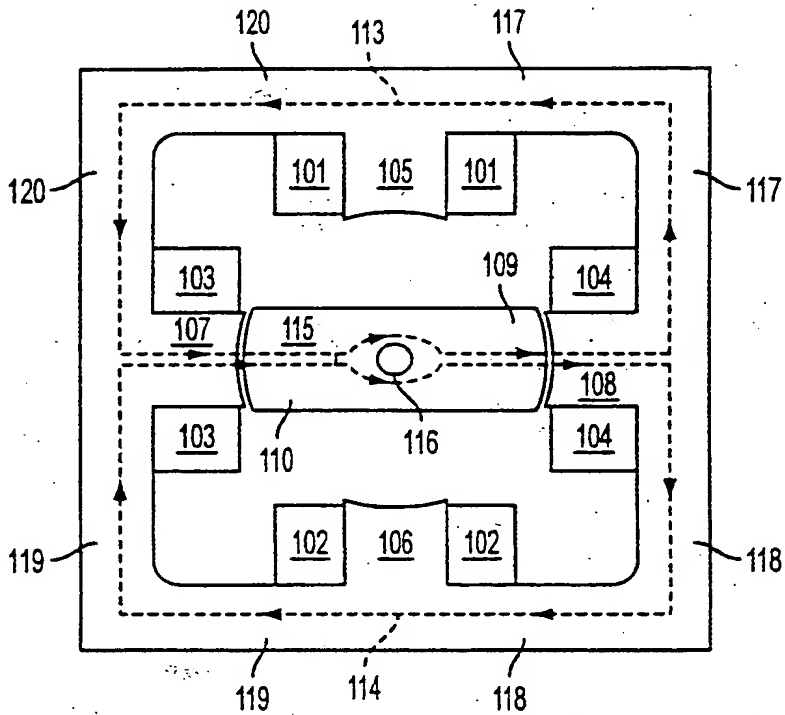

FIG. 2

RELATED ART